

## PATENT ABSTRACTS OF JAPAN

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## (54) ADSORBER

## (57)Abstract:

PURPOSE: To return an adsorber to normal operation in the adsorber having plural adsorption towers such as an oxygen generator and a dry air generator and wherein adsorption and desorption are repeated by switching the switching valves by removing the deposit on the seats of the various valves to recover tightness when the defective seat functions occur due to the deposition.

CONSTITUTION: An air pressure drops due to the abnormal flow of the raw air, when the seats of the drain discharge valve SV1, the switching valves SV2, SV3, SV61 and SV62 of the adsorption tower and the purge valves SV4 and SV5 on the raw air side are out of order. Accordingly, the pressure drop is detected by a pressure switch, the valves are actuated for one second and stopped for one second, the process is repeated five times to forcibly purge the valves, hence the deposit on the seats is removed, and the airtightness of the seats is restored.

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## CLAIMS

## [Claim(s)]

[Claim 1]In an adsorber which has two or more adsorption towers, is switched in a change-over valve, and is made to perform by repeating adsorption and secession, When the predetermined failure of pressure in the circuit concerned is detected with a pressure sensor arranged in a device circuit of the upstream of an adsorption tower, or the downstream, An adsorber with which it will usually switch to operation if the multiple-times opening and closing of the raw-material-fluid side change-over valve in the device circuit concerned, a purge valve, and the drain blowdown valve are carried out compulsorily and a pressure in a circuit is recovered after the time required, and the failure of pressure is characterized by providing a flashing circuit which suspends the device concerned when specified time elapse of after is maintained.

[Claim 2]An adsorber of claim 1, wherein an adsorber is an oxygen generator.

[Claim 3]An adsorber of claim 1, wherein an adsorber is a dry air generator.

[Translation done.]

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention has two or more adsorption towers, such as an oxygen generator and a dry air generator, and switches them in a change-over valve. Improvement of an adsorber made to perform by repeating adsorption and secession is started, and it is related with the adsorber which provided the flashing circuit which cancels automatically the failure of pressure resulting from the poor operation of a gas-passageway change-over valve, and is usually returned to operation.

[0002]

[Description of the Prior Art] Composition as shown in drawing 1 is known by the oxygen generator used as a source of ozone of an ozone generating device. That is, it is first cooled with the condenser 2, and through the drain tank 3, the compressed air from the compressor 1 removes dust etc. with the filter 4, and is sent to the adsorption towers 5 and 6. As for the air which opened change-over valve SV2 and SV6<sub>1</sub> in the adsorption tower 5 and with which while 2 \*\*\*\*\* adsorption towers 5 and 6 are switched by turns in fixed time or a constant pressure, for example, it becomes the adsorption side was introduced in the tower, adsorption treatment of nitrogen, the moisture, etc. is carried out.

[0003] Under the present circumstances, make it secede from the nitrogen to which change-over valve SV3, SV6<sub>1</sub>, SV6<sub>2</sub>, SV7<sub>1</sub>, SV7<sub>2</sub>, and SV10 were closed, and the adsorption tower 6 of another side opened purge valve SV5, was decompressed to atmospheric pressure, and it stuck, moisture, etc. Since it does not fully secede from the nitrogen gas of adsorbent only now, it is made to fully secede from the nitrogen gas which sends into the adsorption tower 6 a part of oxygen gas generated in the adsorption tower 5 via the orifice 9, and is sticking to adsorbent. An oxygen generator obtains high-concentration oxygen gas continuously from the inside of the air by performing this adsorption, decompression, and a secession process by turns continuously.

[0004]

[Problem(s) to be Solved by the Invention] When the oxygen generator had much dust or is operated in the high humidity interior of a room, The garbage by which it was generated by the garbage or corrosion which passed the filter 4 installed in front of an air inlet line or the adsorption towers 5 and 6, such as a suction filter of an air compressor, was got blocked in the sheet part of the change-over valve, and had produced the failure of pressure and oxygen concentration degradation which are depended unusually [ the change of gas ].

[0005] If it explains in full detail, although the filter 4 is installed in the device circuit concerned, why a foreign matter adheres to sheet surfaces, such as change-over valve SV2 of an adsorption tower, SV3, purge valve SV4, and SV5, Particles fine when there are much dust etc. pass a filter in the atmosphere in which the device was installed, it invades in a circuit, particles grow after a prolonged operation, and it adheres to a sheet surface. If corrosive gas exists in a controlled atmosphere, the bill-of-materials side of the gas circuit of the device concerned will corrode with corrosive gas, and will corrode. It is generated by garbage, and if this flows downstream from a gas circuit and garbage adheres to the sheet surface of various valves, the sealing performance will fall and the failure of pressure, the degradation of adsorption material, etc. will occur.

[0006] In the adsorber which this invention has two or more adsorption towers, such as an oxygen generator and a dry air generator, switches it in a change-over valve, and is made to perform by repeating adsorption and secession, An example is taken by the actual condition that neither the failure of pressure nor the degradation of adsorption material is avoided with generating of sheet malfunctioning of garbage adhering in the sheet surface of the various valves in this gas circuit. Sheet part affixes, such as a change-over valve, are removed, and it aims at offer of the adsorber which consists of composition with possible recovering airtightness and making it return to usual operation of the adsorber concerned.

[0007]

[Means for Solving the Problem] Artificers in adsorbers, such as an oxygen generator and a dry air generator, generating of sheet malfunctioning of these various valves, It generates in many cases in the raw-material-air side change-over valve of drain blowdown valve SV1, change-over valve SV2 of an adsorption tower, SV3, SV6<sub>1</sub>, SV6<sub>2</sub> and purge valve SV4, and SV5, When the poor sheet of these change-over valves arises, air pressure descent by an unusual flow of raw material air pays its attention for generating. When the unusual failure of pressure was detected, each change-over valve was operated 5 times with a cycle of for example, a 1-second operation and a 1-second stop, by the operation which purges a change-over valve compulsorily, a sheet part affix of a change-over valve was removed, the knowledge of the ability to recover sheet air leakage efficiency was carried out, and this invention was completed.

[0008] Namely, in an adsorber which this invention has two or more adsorption towers, switches it in a change-over valve, and is made to perform by repeating adsorption and secession, When the predetermined failure of pressure in the circuit concerned is detected with a pressure sensor arranged in a device circuit of the upstream of an adsorption tower, or the downstream, The multiple-times opening and closing of the raw-material-fluid side change-over valve in the device circuit concerned, a purge valve, and the drain blowdown valve are carried out compulsorily, If a pressure in a circuit is recovered after the time required, it will usually switch to operation, and it is an adsorber with which the failure of pressure is characterized by providing a flashing circuit which suspends the device concerned when specified time elapse of after is maintained.

[0009] If it is possible for the target adsorber to have two or more adsorption towers, to switch them in a change-over valve in this invention, and to make it carry out by repeating adsorption and secession, It may be an oxygen generator and a dry air generator which consist of which composition, Standby time is suitably selected according to structure of the target adsorber, a kind of adsorbent, and capacity to on-off (opening and closing) operating time of a change-over valve, repeat frequency, a fall pressure value to detect, standby time to a pressure recovery, and systems breakdown.

[0010] A means to detect the predetermined failure of pressure in the circuit concerned with a pressure sensor which has arranged a flashing circuit which is the feature of this invention in a device circuit of the upstream of an adsorption tower, or the downstream, If a pressure in a means which carries out multiple-times opening and closing compulsorily, and a circuit recovers a change-over valve in the device circuit concerned, a purge valve, and a drain blowdown valve after the time required, a means and the failure of pressure which are usually switched to operation are provided with each means of a means which suspends the device concerned when

specified time elapse of after is maintained. In this invention, if the below-mentioned flashing circuit is operated with a detection signal from a publicly known pressure gauge to a pressure sensor or it becomes specified pressure with a pressure switch publicly known like an example, composition of a switch which generates an active signal, a relay, etc. is employable. In order to carry out the multiple-times opening and closing of a change-over valve, a purge valve, and the drain blowdown valve compulsorily, Since a valve usually comprises an electromagnetic valve, it can be made to carry out electrically at known art, Can select suitably opening-and-closing operating time of a change-over valve, and repeat frequency, and again, Usually, make a means switched to operation, and a means to perform a stop of a device perform on a machinery electrical-and-electric-equipment target which uses a relay etc. similarly, and also. It is possible to control using a computer or to select standby time etc. suitably according to structure of an adsorber, a kind of adsorbent, and capacity to a fall pressure value to detect, standby time to a pressure recovery, and systems breakdown. Although an electromagnetic change-over valve is used for a change-over valve in the example, even if it uses a pneumatics type change-over valve of an air drive, it cannot be overemphasized that same effect is done so.

[0011]

[Function]In the adsorber which has two or more adsorption towers, is switched by a change-over valve in this invention, and is made to perform by repeating adsorption and secession. For example, when the low-pressure power state where the circuit pressure power detected with the pressure switch is lower than a preset value occurs, when the poor operation of the electromagnetic valve which can be restored is the cause easily, the failure of pressure carries out an opening-and-closing operation compulsorily and automatically, and purges the electromagnetic valve of the device concerned.

Therefore, it is possible for the garbage to the sheet surface in an electromagnetic valve, etc. to bite, and to remove \*\*\*\* automatically, and it becomes possible to make it return to normal operation for a short time.

[0012]

[Example]The oxygen generator (PSW) shown in drawing 1 removes dust etc. with the filter 4 after cooling and through the drain tank 3 with the condensor 2, and sends the compressed air from the compressor 1 to the adsorption towers 5 and 6. As for the air which opened change-over valve SV2 in the adsorption tower 5 and with which while 2 \*\*\*\*\* adsorption towers 5 and 6 are switched by turns in fixed time or a constant pressure, for example, it becomes the adsorption side was introduced in the tower, adsorption treatment of nitrogen, the moisture, etc. is carried out. . Make it secede from the nitrogen to which change-over valve SV3, SV6<sub>1</sub>, SV6<sub>2</sub>, SV7<sub>1</sub>, SV7<sub>2</sub>, and SV10 were closed, and the adsorption tower 6 of another side opened purge valve SV5, was decompressed to atmospheric pressure, and it stuck, moisture, etc. Since it does not fully secede from the nitrogen gas of adsorbent only now, it is made to fully secede from the nitrogen gas which sends into the adsorption tower 6 a part of oxygen gas generated in the adsorption tower 5 via the orifice 9, and is sticking to adsorbent. PSW obtains high-concentration oxygen gas continuously from the inside of the air by performing adsorption, decompression, and a secession process by turns continuously like the above, and high-concentration-oxygen gas is supplied to the predetermined ozonizer from outlet valve SV8 through the buffer tank 7.

[0013]In PSW shown in drawing 1, further to the downstream of circuit lowest style, i.e., outlet valve SV, 8. The pressure switch 8 is allocated, although the signal of the pressure switch 8 is not illustrated, it is made to input into a solenoid operated directional control valve, the compressor 1, and the computer that performs control of the ozonizer to connect altogether, and control is performed according to the flow of drawing 2. That is, in the above composition, if line pressure will be 4 atmospheres, the adsorption towers 5 and 6 will be switched by turns, but although a pressure falls to 2 atmospheres momentarily, if it recovers to 4 atmospheres in 30 seconds at this time, in the case of normal operation, it will detect with the pressure switch 8, and it will switch a predetermined change-over valve, respectively.

[0014]Next, when the low-pressure power detected with the pressure switch 8 continues 180 seconds or more, the ozonizer to connect is stopped and the flashing circuit which is the feature of this invention is operated. At the time of a flashing circuit operation, the garbage etc. which carry out automatically, bit [ compulsion and ] the operation which opens all the solenoid operated directional control valves in the circuit except oxygen outlet valve SV8 for 1 second, and which is closed for /1 second to the sheet surface in an electromagnetic valve 5 times in the meantime, and were full are removed automatically. However, when the low-pressure power concerned continues 180 seconds or more and it is in a low-pressure power state even if an ozonizer is stopped, the flashing circuit operates and 180 seconds or more pass after that further, an abnormality alarm is taken out and all the devices are stopped. . A compulsory valve action operates all of adsorption tower change-over valve SV2, SV3, purge valve SV4, SV5, and drain blowdown valve SV1. Flushing also of drain blowdown valve SV1 is carried out because there is a possibility that it may be generated by the poor sheet, air may leak outside, and the pressure of a circuit may decline when a foreign matter adheres to the sheet surface.

[0015]

[Effect of the Invention]In the case of the oxygen generator of an example, at the time of sheet malfunctioning generating by the sheet part affix of each change-over valve, the adsorber provided with the flashing circuit by this invention can remove an affix compulsorily, can recover the sheet function of each change-over valve, and has neither the failure of pressure nor the degradation of adsorption material. An effect can be similarly acquired about an oxygen generator and the dry air generator which has an adsorption tower similarly. The thing, decreases, is possible for the adsorber provided with the flashing circuit by this invention in the number of times of a maintenance for maintaining the sheet performance of a change-over valve.

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## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a circuit diagram showing the composition of the oxygen generator which has a flashing circuit by this invention.

[Drawing 2] It is a flow chart figure showing the operation of the flashing circuit by this invention.

[Description of Notations]

- 1 Compressor
- 2 Condensator
- 3 Drain tank
- 4 Filter
- 5 and 6 Adsorption tower
- 7 Buffer tank
- 8 Pressure switch
- 9 Orifice
- SV1 Drain blowdown valve
- SV4, SV5 purge valve
- SV2, SV3, SV6<sub>1</sub>, SV6<sub>2</sub>, SV7<sub>1</sub>, SV7<sub>2</sub>, SV8, SV9, and SV10 Change-over valve

[Translation done.]

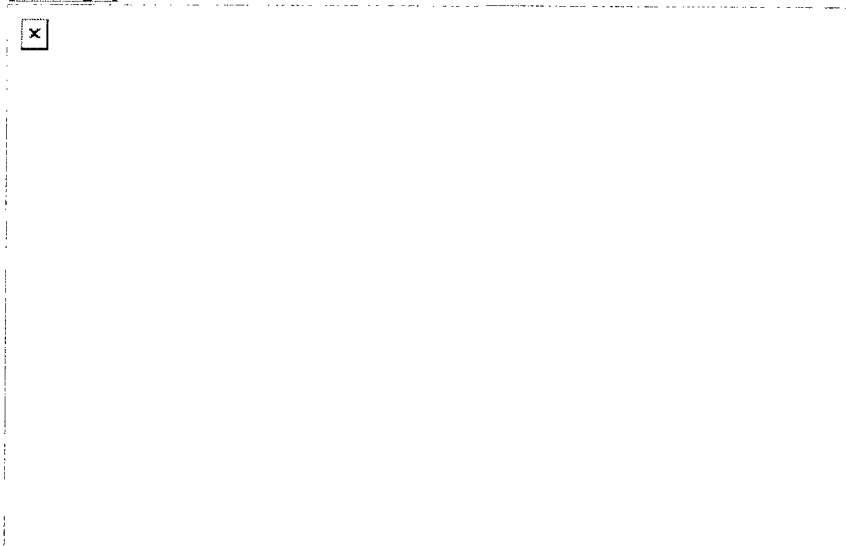
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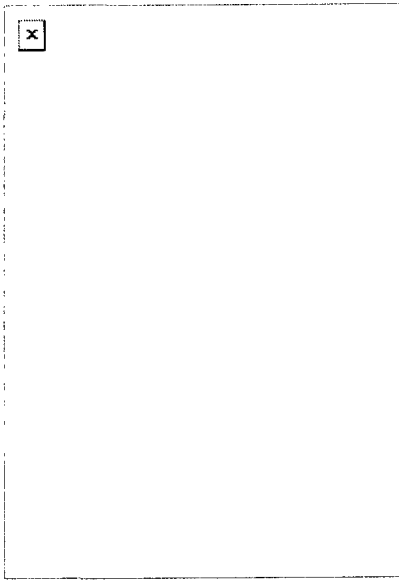
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## DRAWINGS

[Drawing 1]



[Drawing 2]



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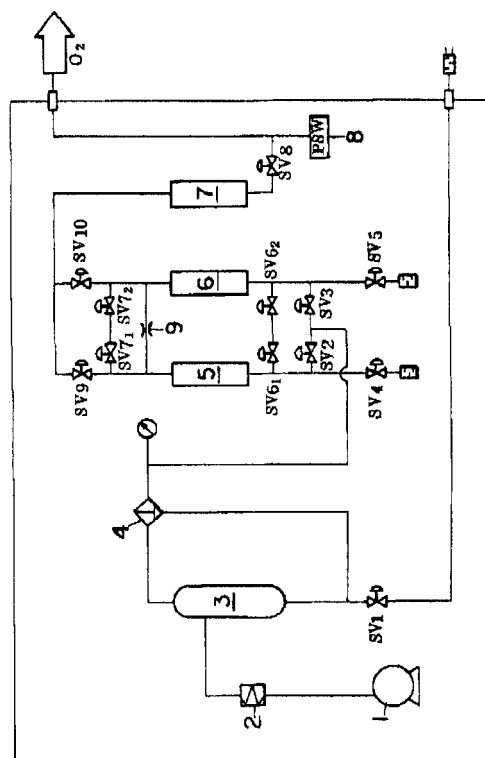
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(54)【発明の名称】 吸着装置

(57)【要約】

【目的】 酸素発生装置や乾燥空気発生装置等の複数の吸着塔を有し切換弁にて切替え、吸着と離脱を繰り返して行わせる吸着装置において、各種弁のシート面にゴミが付着するなどのシート機能不良の発生時に、切換弁などのシート部付着物を除去し、気密性を回復させて当該吸着装置の通常運転に復帰させる。

【構成】 酸素発生装置のドレン排出弁SV1、吸着塔の切換弁SV2、SV3、SV6<sub>1</sub>、SV6<sub>2</sub>及びパージ弁SV4、SV5の原料空気側切換弁にシート不良が発生した場合、原料空気の異常流れによる空気圧力降下が発生するため、これを圧力スイッチで検知し、各々の切換弁を例えば1秒作動、1秒停止の周期にて5回作動させ、強制的に切換弁をパージする作動により、切換弁のシート部付着物を除去し、シート気密性を回復させる。



## 【特許請求の範囲】

【請求項1】 複数の吸着塔を有し切換弁にて切換え、吸着と離脱を繰り返して行わせる吸着装置において、吸着塔の上流側あるいは下流側の装置回路内に配置した圧力検出器にて当該回路内の所定の圧力低下を検知した際、当該装置回路内の原料流体側切換弁、パージ弁、ドレン排出弁を強制的に複数回開閉させ、回路内の圧力が所要時間後回復すれば通常運転に切換え、圧力低下が所定時間経過後も維持された場合、当該装置の停止を行うフラッシング回路を設けたことを特徴とする吸着装置。

【請求項2】 吸着装置が酸素発生装置であることを特徴とする請求項1の吸着装置。

【請求項3】 吸着装置が乾燥空気発生装置であることを特徴とする請求項1の吸着装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】この発明は、酸素発生装置や乾燥空気発生装置等の複数の吸着塔を有し切換弁にて切換え、吸着と離脱を繰り返して行わせる吸着装置の改良に係り、ガス流路切換弁の作動不良などに起因する圧力低下を自動的に解消して通常運転に復帰させるフラッシング回路を設けた吸着装置に関する。

## 【0002】

【従来の技術】オゾン発生装置のオゾン源として用いられる酸素発生装置には、図1に示すような構成が知られている。すなわち、コンプレッサ1からの圧縮空気は、まず冷却器2で冷却されドレンタンク3を経て、フィルター4にて塵埃等を取り除き吸着塔5、6に送られる。2塔ある吸着塔5、6は一定時間または一定圧力にて交互に切り換えられ、例えば、吸着側となる一方の吸着塔5では切換弁SV2、SV6<sub>1</sub>を開き、塔内に導入された空気は窒素、水分等が吸着除去される。

【0003】この際、他方の吸着塔6は切換弁SV3、SV6<sub>2</sub>、SV7<sub>1</sub>、SV7<sub>2</sub>、SV10が閉じられて、パージ弁SV5を開き、大気圧まで減圧されて吸着した窒素、水分等を離脱させるが、これのみでは吸着剤の窒素ガスは十分に離脱しないので、吸着塔5で生成された酸素ガスの一部をオリフイス9を経由して吸着塔6に送り込み吸着剤に吸着している窒素ガスを十分に離脱させる。酸素発生装置は、この吸着と減圧及び離脱工程を連続して交互に行うことにより、空気中より連続して高濃度の酸素ガスを得る。

## 【0004】

【発明が解決しようとする課題】酸素発生装置が粉塵が多いかあるいは高湿度な室内にて運転された場合、空気圧縮機の吸い込みフィルターなど空気入口ライン、あるいは吸着塔5、6前に設置されたフィルター4を通過したゴミまたは腐食により発生したゴミが、切換弁のシート部に詰まり、ガスの切り換え異常による圧力低下、酸素濃縮性能低下を生じていた。

【0005】詳述すると、吸着塔の切換弁SV2、SV3、パージ弁SV4、SV5などのシート面に異物が付着する理由は、当該装置回路にはフィルター4が設置されているが、装置の設置された雰囲気中に粉塵などが多い場合には、細かな粒子がフィルターを通過して回路内に侵入し、長期間の作動後に粒子が成長してシート面に付着する。また、雰囲気ガス中に腐食性ガスが存在すると、当該装置のガス回路の部品表面が腐食性ガスにより浸食されて腐食し、ゴミが発生してこれがガス回路の下流に流れてゆき、各種弁のシート面にゴミが付着するとその密封性が低下し、圧力低下や吸着材の性能低下などが発生する。

【0006】この発明は、酸素発生装置や乾燥空気発生装置等の複数の吸着塔を有し切換弁にて切換え、吸着と離脱を繰り返して行わせる吸着装置において、かかるガス回路内の各種弁のシート面にゴミが付着するなどのシート機能不良の発生にともない圧力低下や吸着材の性能低下が避けられない現状に鑑み、切換弁などのシート部付着物を除去し、気密性を回復させて当該吸着装置の通常運転に復帰させることが可能な構成からなる吸着装置の提供を目的としている。

## 【0007】

【課題を解決するための手段】発明者らは、酸素発生装置や乾燥空気発生装置等の吸着装置において、かかる各種弁のシート機能不良の発生は、ドレン排出弁SV1、吸着塔の切換弁SV2、SV3、SV6<sub>1</sub>、SV6<sub>2</sub>及びパージ弁SV4、SV5の原料空気側切換弁に発生することが多く、これらの切換弁のシート不良が生じた場合、原料空気の異常流れによる空気圧力低下が発生するに着目し、異常な圧力低下が検出された場合、各々の切換弁を例えば1秒作動、1秒停止の周期にて5回作動させ、強制的に切換弁をパージする作動により、切換弁のシート部付着物を除去し、シート気密性能を回復させることができることを知見し、この発明を完成した。

【0008】すなわち、この発明は、複数の吸着塔を有し切換弁にて切換え、吸着と離脱を繰り返して行わせる吸着装置において、吸着塔の上流側あるいは下流側の装置回路内に配置した圧力検出器にて当該回路内の所定の圧力低下を検知した際、当該装置回路内の原料流体側切換弁、パージ弁、ドレン排出弁を強制的に複数回開閉させ、回路内の圧力が所要時間後回復すれば通常運転に切換え、圧力低下が所定時間経過後も維持された場合、当該装置の停止を行うフラッシング回路を設けたことを特徴とする吸着装置である。

【0009】この発明において、対象とする吸着装置は、複数の吸着塔を有し切換弁にて切換え、吸着と離脱を繰り返して行わせることが可能であれば、いずれの構成からなる酸素発生装置や乾燥空気発生装置であってもよく、切換弁のオンオフ（開閉）作動時間、繰り返し回数、検出する低下圧力値、圧力回復までの待機時間、シ

システム停止まで待機時間などは、対象とする吸着装置の構造、吸着剤の種類、容量に応じて適宜選定される。

【0010】この発明の特徴であるフラッシング回路は、吸着塔の上流側あるいは下流側の装置回路内に配置した圧力検出器にて当該回路内の所定の圧力低下を検知する手段、当該装置回路内の切換弁、パージ弁、ドレン排出弁を強制的に複数回開閉させる手段、回路内の圧力が所要時間後回復すれば通常運転に切換える手段、圧力低下が所定時間経過後も維持された場合、当該装置の停止を行う手段の各手段を備えている。この発明において、圧力検出器には公知の圧力計からの検知信号により後述のフラッシング回路を作動させたり、実施例のごとく公知の圧力スイッチにて所定圧力となれば作動信号を発生するスイッチ、リレーなどの構成を採用することができる。切換弁、パージ弁、ドレン排出弁を強制的に複数回開閉させるには、弁が通常、電磁弁から構成されるため、公知技術にて電気的に行わせることができ、切換弁の開閉作動時間、繰り返し回数を適宜選定することができる。また、通常運転に切換える手段や装置の停止を行う手段も同様に、リレー等を使用した機械電気的に行わせる他、コンピューターを使用して制御したり、吸着装置の構造、吸着剤の種類、容量に応じて、検出する低下圧力値、圧力回復までの待機時間、システム停止まで待機時間などを適宜選定することが可能である。なお、実施例では切換弁に電磁式切換弁を使用しているが、空気駆動の空圧式切換弁を使用しても同様の効果を奏することはいうまでもない。

#### 【0011】

【作用】この発明は、複数の吸着塔を有し切換弁にて切換え、吸着と離脱を繰り返して行わせる吸着装置において、例えば、圧力スイッチにて検出された回路圧力が設定値より低い低圧力状態が発生した場合、圧力低下が容易に復旧可能な電磁弁の作動不良などが原因の場合は、当該装置の電磁弁を強制的、自動的に開閉作動させてパージすることにより、電磁弁内のシート面へのゴミなどの噛みこみを自動的に取り除くことが可能で、短時間で正常運転に復帰させることが可能になる。

#### 【0012】

【実施例】図1に示す酸素発生装置（PSW）は、コンプレッサ1からの圧縮空気を冷却器2で冷却後、ドレンタンク3を経て、フィルター4にて塵埃等を取り除き吸着塔5、6に送る。2塔ある吸着塔5、6は一定時間または一定圧力にて交互に切り換えられ、例えば、吸着側となる一方の吸着塔5では切換弁SV2を開き、塔内に導入された空気は窒素、水分等が吸着除去される。他方の吸着塔6は切換弁SV3、SV6<sub>1</sub>、SV6<sub>2</sub>、SV7<sub>1</sub>、SV7<sub>2</sub>、SV10が閉じられて、パージ弁SV5を開き、大気圧まで減圧されて吸着した窒素、水分等を離脱させるが、これのみでは吸着剤の窒素ガスは十分に離脱しないので、吸着塔5で生成された酸素ガスの一部を

オリフイス9を経由して吸着塔6に送り込み吸着剤に吸着している窒素ガスを十分に離脱させる。PSWは、上記のごとく吸着と減圧及び離脱工程を連続して交互に行うことにより、空気中より連続して高濃度の酸素ガスを得るもので、高濃度酸素ガスはバッファタンク7を経て、出口弁SV8より所定のオゾナイザーに供給されている。

【0013】図1に示すPSWには、さらに、回路最下流、すなわち出口弁SV8の下流側に、圧力スイッチ8を配設しており、圧力スイッチ8の信号は図示しないが全て電磁切換弁やコンプレッサ1、接続するオゾナイザーの制御を行うコンピューターに入力させ、図2のフローに従いに制御が行われる。すなわち、以上の構成において、正常運転の場合は回路内圧力が4気圧になると吸着塔5、6を交互に切り換えるが、この時、瞬間的に圧力が2気圧に低下するが30秒で4気圧に回復すると、圧力スイッチ8にて検知して所定の切換弁をそれぞれ切り換える。

【0014】次に、圧力スイッチ8にて検知した低圧力が180秒以上継続した場合、接続するオゾナイザーを停止させて、この発明の特徴であるフラッシング回路を作動させる。フラッシング回路作動時は、酸素出口弁SV8を除く回路内の全ての電磁切換弁を、1秒開く／1秒閉じる動作を5回強制かつ自動的に行うもので、この間、電磁弁内のシート面へ噛みこまれたゴミなどを自動的に取り除く。但し、当該低圧力が180秒以上継続した場合、オゾナイザーを停止させて、フラッシング回路が作動し、さらにその後180秒以上経過しても低圧力状態である時は、異常警報を出して全ての装置を停止させる。なお、強制的な弁作動は、吸着塔切換弁SV2、SV3、パージ弁SV4、SV5、ドレン排出弁SV1の全てを作動させるが、ドレン排出弁SV1もフラッシングするのは、そのシート面に異物が付着するとシート不良が発生して空気が外部に漏れて回路の圧力が低下する恐れがあるためである。

#### 【0015】

【発明の効果】この発明によるフラッシング回路を備えた吸着装置は、実施例の酸素発生装置の場合、各切換弁のシート部付着物によるシート機能不良発生時に、強制的に付着物を除去し、各切換弁のシート機能を回復させることができ、圧力低下や吸着材の性能低下がない。また、酸素発生装置と同様に吸着塔を有する乾燥空気発生装置についても同様に効果を得ることができる。この発明によるフラッシング回路を備えた吸着装置は、切換弁のシート性能を維持するためのメンテナンス回数を減らすことが可能である。

#### 【図面の簡単な説明】

【図1】この発明によるフラッシング回路を有する酸素発生装置の構成を示す回路図である。

【図2】この発明によるフラッシング回路の作動を示す



フローチャート図である。

【符号の説明】

- 1 コンプレッサ
- 2 冷却器
- 3 ドレンタンク
- 4 フィルター
- 5, 6 吸着塔

\* 7 バッファタンク

8 圧力スイッチ

9 オリフィス

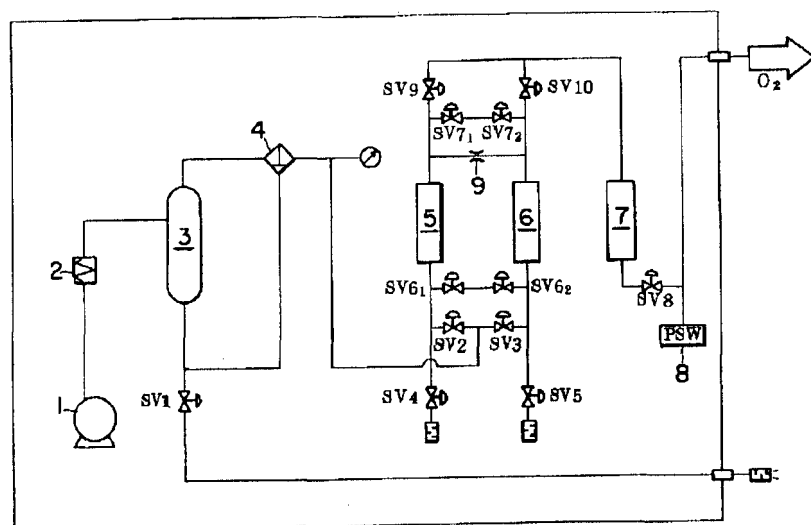
SV1 ドレン排出弁

SV4, SV5 パージ弁

SV2, SV3, SV6<sub>1</sub>, SV6<sub>2</sub>, SV7<sub>1</sub>, SV

\* 7<sub>2</sub>, SV8, SV9, SV10 切換弁

【図1】



【図2】

